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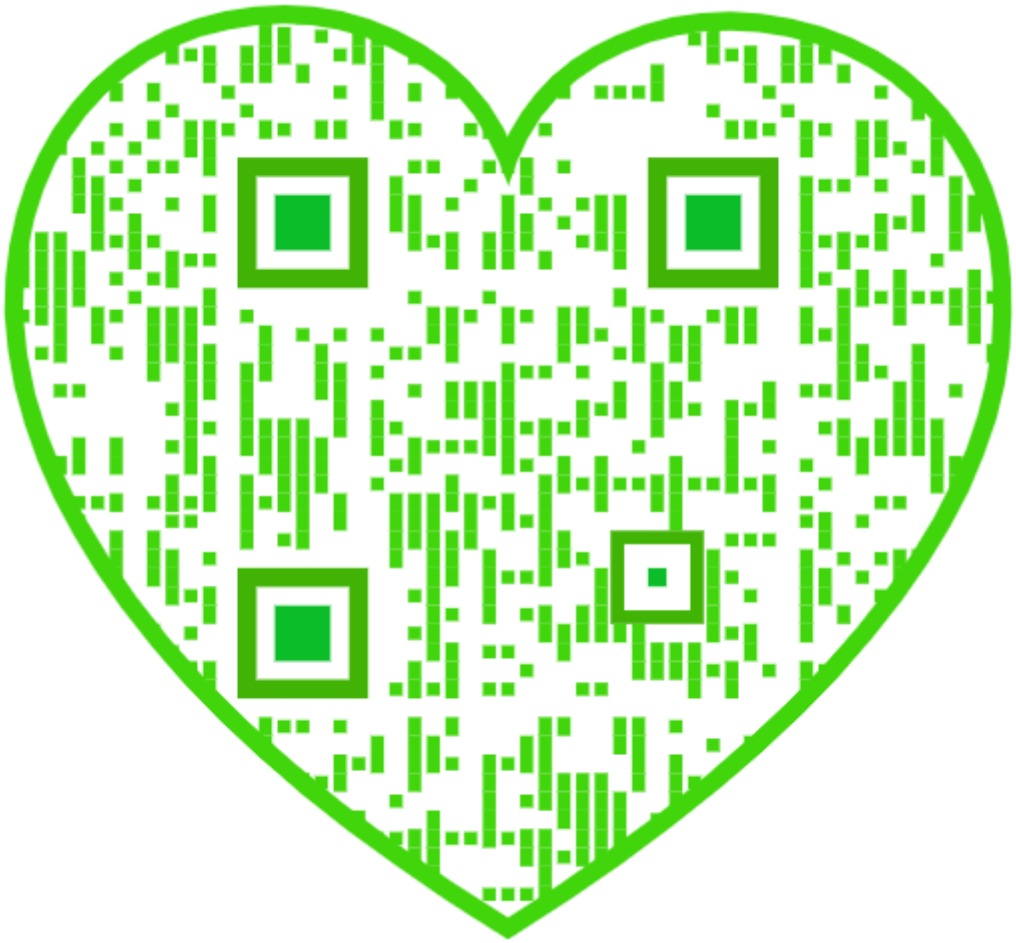
U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 999

rev. May 1927

Rev. ed. follows

Sweet-potato Growing



SWEET POTATOES for home use can be grown under a wide range of conditions, but the commercial production of the crop is limited to sections where soil, climate, and marketing conditions are favorable.

Sweet potatoes work in well with a rotation of farm or truck crops, and if improved methods of growing and storing the crop are employed good returns are realized.

The sweet potato is propagated by plants or slips and by vine cuttings. The plants are produced by sprouting the seed potatoes in warm sand. The cuttings are made in the field after the plants begin to vine.

When bottom heat is necessary for growing the plants, the hotbed can be heated with manure, by flues, or by steam or hot-water pipes. In the South, where no bottom heat is necessary, the plants are grown in beds in the open ground.

Careful preparation of the soil and thoroughness in setting the plants are material factors which go a long way toward success.

The crop must be carefully harvested and handled, and if to be kept must be stored in a suitable storage house.

Careful packing in attractive packages is a requisite to profitable returns.

Washington, D. C. Issued February, 1919; revised May, 1927

SWEET-POTATO GROWING

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IMPORTANCE OF THE CROP

THE SWEET POTATO is second only to the potato in its importance as a commercial truck crop. It is suitable for growing in many sections where the boll weevil has interfered with the production of cotton, and moreover the development of the sweet-potato storage house[2] has greatly increased the season through which sweet potatoes are available on the markets and thereby has stabilized the industry. The sweet potato is one of the principal vegetable foods of the people living in the Southern States, and its use can be greatly increased in all sections of the United States, but especially in the North.

For home use sweet potatoes can be grown under a wide range of conditions, but when they are to be produced commercially careful consideration should be given to the soil and climate and to market, transportation, and storage facilities. The southern and many of the eastern markets usually are well supplied with sweet potatoes, but in many sections in the North and West the people have not become accustomed to using them. The fact that sweet potatoes can be stored, cured, and later shipped to any part of the United States makes it practicable to supply people outside the sweet-potato section, as well as those within its limits, with this valuable root crop.

REGIONS ADAPTED TO SWEET POTATOES

The sweet potato, being a native of tropical America, naturally thrives best in the warmer portions of the United States. Nearly 90 per cent of this crop is produced in the Southern States. The areas suited to its commercial production, as indicated by the dotted portions of the map shown as Figure 1, extend from New Jersey southward and westward to Texas and include central and southern California.

The climate best suited to sweet potatoes is one that has a growing period of at least four months, a moderate rainfall during this period, warm nights, and plenty of sunshine. In sections where the rainfall is very light, growers resort to irrigation with good success. Care should be exercised as to the time of applying the water. The greatest quantity should be applied between the time of setting the plants and the time when the vines practically cover the ground. Too much water applied during the latter part of the growing season will produce a very heavy vine growth at a sacrifice of the potatoes. The water

[1] This bulletin is a revision of the following publication, which it supersedes:
BEATTIE, W. R. SWEET POTATOES. U. S. Dept. Agr. Farmers' Bul. 324, 39 p., illus. 1908.
The present edition has been slightly revised by J. H. Beattie.

[2] THOMPSON, H. C. STORAGE OF SWEET POTATOES. Farmers' Bul. 1442. 22 p. Illus. 1925.

should be withheld altogether for some time before harvesting the crop, in order to give the potatoes proper ripening conditions.

SOILS ADAPTED TO SWEET POTATOES

A light well-drained sandy loam with a clay subsoil is the ideal soil for sweet potatoes, although the crop can be grown with good success on a wide range of soils if the growing period is sufficiently long. Sweet potatoes are sometimes grown in almost pure sand, and with a reasonable quantity of commercial fertilizer good results may be obtained. On very fertile soils the crop tends to run to vines at the expense of the potatoes; moreover, the potatoes formed are likely to be rough and irregular in appearance, which reduces their market value. Fair yields can be obtained on worn-out cotton and tobacco lands in the South, especially where a good rotation is followed and a leguminous crop is turned under. A moderate quantity of organic matter in the soil is very essential for the best results in growing sweet potatoes on soils lacking in fertility.

Sweet potatoes are particularly adapted to newly cleared lands, such as the cut-over pine lands of the South. It is better, however, to grow corn the first year and follow this with sweet potatoes the second year. This is especially true of land that has been recently cleared, because the roots interfere with the cultivating and harvesting of sweet potatoes.

Good drainage is just as important for sweet potatoes as for other crops. It is never advisable to plant this crop on any soil unless it is fairly well drained, and even then in most cases it is best to plant on ridges to keep the surface water from standing around the plants. The surface soil should be 6 to 8 inches in depth and underlain with a clay subsoil porous enough to carry off the surplus water and yet of such a nature as to prevent fertilizers from leaching away. A deep surface soil with a sandy or very porous subsoil must not be selected, as it will produce long stringy potatoes which are unfit for market. On the other hand, the surface soil may be too shallow. In such a case it should be deepened each year by gradually increasing the depth of plowing until the desired depth is obtained.

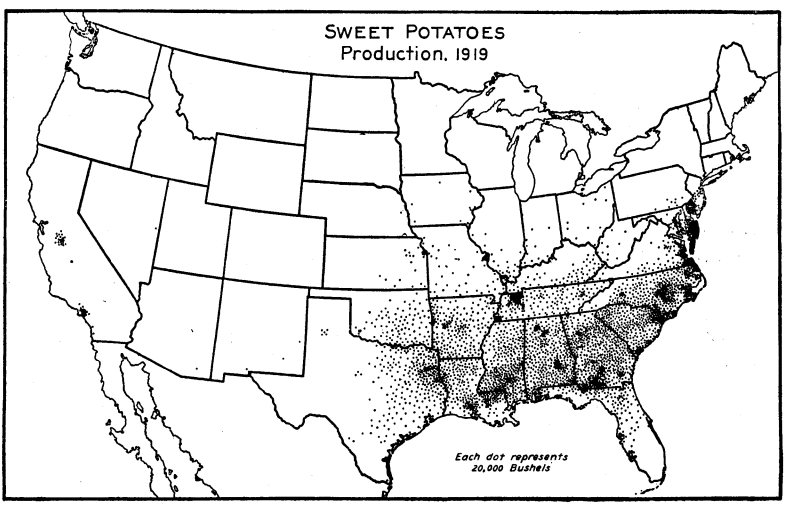

FIG. 1.—Map of the United States, showing the areas where sweet potatoes are grown

ROTATION OF CROPS

Crop rotation in growing sweet potatoes is important from the standpoint of soil improvement, increased production, and the control of diseases. A rotation in which sweet potatoes are grown on the land once in three or four years, combined with seed selection and hotbed sanitation, is effective in preventing loss from stem rot, black rot, and other injurious diseases. By following a rotation which includes crops having different feeding

habits and by plowing under green manures, the fertility of the soil is improved and larger yields of all the crops included in the rotation are realized. The practice of following the sweet-potato crop with a cover crop is a good one. In Virginia and regions farther north, when the potatoes are dug for early markets, crimson clover may be sown for a cover crop provided the potatoes are off by September 1 to 15 in New Jersey, Delaware, and Maryland, and by September 30 in southern Virginia. Where the potatoes occupy the land too late for planting crimson clover, a cover crop of rye or of oats and vetch should be used.

The following outlines of 3-year and 4-year rotations are offered as suggestions, but these should be varied according to conditions and local commercial crops.

For the Cotton Belt, where sweet potatoes are grown as a farm crop.

(1) First year. (*a*) Cotton, followed by rye for winter pasture or as a crop to turn under; or,
(*b*) Corn, with cowpeas or velvet beans planted as a soil-improving crop.
Second year. Sweet potatoes, followed by a winter cover crop of rye or oats and vetch.
Third year. Oats, followed by peanuts or cowpeas.

(2) First year. Sweet potatoes, followed by a winter crop of rye or oats and vetch.
Second year. Cotton, with rye sown between the rows for winter pasture or to turn under.
Third year. Corn, with cowpeas or velvet beans planted as a soil-improving crop.

A 4-year rotation for the southern sweet-potato section.

First year. Sweet potatoes.
Second year. Winter oats, followed by peanuts or cowpeas.
Third year. Cotton, with bur clover between the rows.
Fourth year. Corn, with cowpeas or velvet beans between the rows.

A 3-year rotation for the Eastern Shore of Virginia and Maryland.

First year. Sweet potatoes, followed by crimson clover or rye as a winter cover crop.
Second year. Early potatoes. On many farms corn is planted between the rows of potatoes at the last cultivation; on other farms the potatoes are followed by fall vegetables.
Third year. Winter oats, followed by cowpeas for hay.

In planning a sweet-potato rotation, the importance of plowing under a soil-improving crop once every two or three years should be borne in mind. The crops to include in this rotation will vary according to local conditions. Wherever practicable, a leguminous crop, such as cowpeas, soy beans, velvet beans, or crimson clover, should be used in order to supply nitrogen as well as humus.

FERTILIZERS AND MANURES

COMMERCIAL FERTILIZERS

The yield of sweet potatoes is increased by a judicious use of commercial fertilizer. The kind and the quantity that should be used depend upon the fertility of the soil. Every grower should make a study of his soil requirements and should apply those fertilizers that give the best results.

In the northern commercial sections where the sweet potato is grown as a truck crop and has a comparatively brief growing season the crop must mature in the shortest possible period. In these sections a heavy application of a high-grade fertilizer is practicable. A fertilizer analyzing 2 to 4 per cent of nitrogen, 8 per cent of phosphoric acid, and, when available, 8 to 10 per cent of potash should give good results. Although fertilizer can be obtained already mixed, some growers prefer to buy the ingredients and mix their own. Others use a standard fertilizer as a base and increase the percentage of certain plant foods to suit their soil conditions.

The quantity of fertilizer applied depends upon the fertility of the soil, and to some extent upon the cropping system used. In the northeastern section 1,000 to 1,500 pounds per acre is applied broadcast or in the row, but it is believed that not over 500 pounds per acre should be applied in the row, as a larger quantity may injure the plants. When applied in the row, the fertilizer should be thoroughly mixed with the soil. In the South 600 to 1,000 pounds per acre is sometimes applied in the drill. In that section special attention is given to improving the fertility of the soil by a rotation including leguminous crops, for which the long growing season is especially favorable.

On the sandy loam soils of the South, where the sweet potato is grown as a farm crop and where the climate is especially adapted to it, good yields can be obtained without heavy applications of high-grade fertilizers. A common practice has been to use a mixture of 1 part cottonseed meal to 2 or 3 parts of 16 per cent acid phosphate at the rate of 500 to

600 pounds per acre, drilled under the row in preparing the land for planting; but better results are usually obtained by adding a small quantity of potash. In recent experimental work, yields have been greatly increased by the application of as little as 100 pounds of muriate of potash to the acre.

The fertilizer should be applied a week or more before setting the plants. This allows it to become more thoroughly incorporated with the soil. Very serious mistakes are often made by setting plants too soon after applying fertilizer, especially if a heavy application has been made. The roots coming in contact with the fertilizer in a concentrated form are seriously injured.

The method of applying fertilizers depends upon the system of culture to be followed, the fertility of the soil, and the quantity applied. Where level culture is intended or where the land is very poor the fertilizer should be applied broadcast and at a higher rate than where it is applied in the row.

The general custom in the eastern sweet-potato sections is to apply the fertilizer where the ridges are to be, several days in advance of planting. This is done with a 1-row distributor, as shown in Figure 2. This implement merely sows the fertilizer and is followed by a turnplow to throw up the ridge. The type in most common use among sweet-potato growers, however, opens a shallow furrow, sows the fertilizer, and throws up a ridge by means of a set of disks attached to the rear end of the distributor.

FIG. 2.—A 1-horse fertilizer sower in operation

STABLE MANURE

On soils deficient in organic matter stable manure gives good results. In sections where no rotation is followed and practically all vegetation is removed from the soil, the growers keep up the organic content of the soil by the use of stable manure. The time of application is very important. If applied in the preparation of the land for planting, the difficulty in keeping down weeds will be increased and the growth of vines stimulated at the expense of root growth. The manure should be applied to the previous crop, or, as is the practice in New Jersey, it may be broadcasted over the land in the fall and thoroughly worked into the soil early in the spring before planting sweet potatoes. The manure is carted to the field and spread broadcast with forks or applied with manure spreaders at the rate of 10 to 15 tons per acre. Where stable manure can be obtained in sufficient quantities at a reasonable price and the cost of hauling is not excessive, its use is recommended, although the organic matter in the soil can be kept up

without it by plowing under cover crops.

GREEN MANURES

The use of green manures is the most economical method of maintaining sufficient organic matter in the soil. Legumes, such as crimson clover, cowpeas, and soy beans, grown in rotation as soil-improving crops are best for this purpose.

In the northern sweet-potato sections, when corn is included in the rotation, crimson clover is sown between the rows at the last cultivation. The clover makes a good growth in early spring and can be plowed under in preparing the land for sweet potatoes. For the best results the crimson clover should be plowed under as it is coming into bloom and should have sufficient time to decompose before the plants are set.

In the Southern States, where crimson clover can not be grown successfully, other crops, such as cowpeas, soy beans, peanuts, rye, and oats, will give satisfactory results. Where peanuts are used as a soil-improving crop the nuts are harvested by hogs, which leave most of the vines and roots in the soil.

LIME

The use of lime may be important in growing sweet potatoes, but it should be used with discretion. Green material has a tendency to sour the land, and where a large quantity of it is plowed under, the soil is improved greatly by the addition of 1,500 to 2,000 pounds of burned lime per acre. Where a 3-year rotation is practiced, burned lime should be used once every three years at the rate of 1,000 to 2,000 pounds per acre. It should be applied the fall before planting sweet potatoes or after plowing under a green crop. When air-slaked lime is used apply about one-half more, and when ground limestone is used double the quantity suggested for burned lime.

HARDWOOD ASHES

The fertilizing value of hardwood ashes varies. Unleached wood ashes contain from 1 to 2 per cent of phosphoric acid, 4 to 6 per cent of potash, and about 30 to 35 per cent of lime. On leaching, the potash is reduced greatly. Unleached hardwood ashes, applied broadcast or under the row at the rate of 1,200 to 1,500 pounds per acre, are desirable, but owing to their scarcity their use is not common.

PROPAGATION OF PLANTS

Sweet potatoes are grown either from plants or slips produced from potatoes, or from vine cuttings. In the northern sweet-potato sections a large part of the commercial crop is grown from slips produced by sprouting seed potatoes in a warm bed of soil. Here the slips are used for the main crop, while the vine cuttings, which commonly do not have time to make roots of marketable size, produce the seed crop for the next season.

In the regions south of Virginia sweet potatoes are often grown from vine cuttings. In this case enough roots are bedded to produce sufficient slips for about one-eighth of the area to be planted. These slips are planted in the usual manner, and when the vines begin to run cuttings are taken for planting the remainder of the field.

When slips alone are used, from 6 to 8 bushels of seed potatoes are required to produce enough plants from the first pulling to set an acre. When two or three pullings are made, 3 to 4 bushels of seed ordinarily will produce slips enough for an acre. The quantity depends upon the distance between the plants in the field. The practice of New Jersey growers is to bed 1 bushel of seed roots for each 1,000 plants desired. With good roots in well-made and well-managed beds the number of plants produced will average much higher, but any excess over the number desired can usually be disposed of at a profit.

Whatever method is used in propagating the plants, precautions against sweet-potato diseases should be taken. (See p. 15.)

GROWING PLANTS IN THE OPEN

In most sections of the South sweet-potato plants for the main crop can be produced in open beds. A well-protected location, preferably on the south side of a building or tight fence, is selected for the bed. The drainage should be away from the bed. An excavation is made, 5 or 6 inches deep, 5 to 6 feet wide, and as long as needed for the quantity of sweet potatoes to be bedded. About 4 inches of sand or a loose loam is put in the excavation and leveled; then the potatoes are placed by hand, leaving at least an inch space between them. After the potatoes are bedded they are covered to the depth of an inch with sand or loose loam. If the land is at all dry the bed is then watered

thoroughly by sprinkling with a hose or with a sprinkling can. When the plants begin to show through the surface an inch or two, more sand or soil is added, in order to develop a good root system. Some growers cover the sweet-potato bed with straw, hay, or leaves to prevent the surface from drying out too rapidly and to protect it from cold.

GROWING PLANTS IN COLDFRAMES

In the sections of the South where sweet potatoes are grown as an early truck crop the plants are often produced in a canvas-covered or glass-covered coldframe. In selecting a location for a coldframe the same points should be considered as for an open bed. A location similar to the one shown in Figure 3 is satisfactory, as the beds are protected from the cold winds by a natural forest windbreak.

Coldframes may be built entirely above ground or partly below the surface. The usual practice is to make an excavation 5 to 6 inches deep, 6 feet wide, and as long as necessary. A frame is made of 12-inch boards on the north or west side and 6-inch or 8-inch boards on the south or east side, and the ends are boxed up. The sides of the frame are held in place by stakes driven in the ground at intervals of about 6 feet or by pieces nailed across the top. If the bed is made below the surface of the ground the frame should fit in the excavation. When built above ground the frame is nailed together and set on the surface, and earth is banked up against it all around in order to protect it from the cold. For a permanent bed, make the walls of concrete instead of wood.

The coldframe may be covered with canvas or with hotbed sash. When hotbed sash is used it is advisable to have crosspieces at intervals of 3 feet. These crosspieces act as supports for the sash.

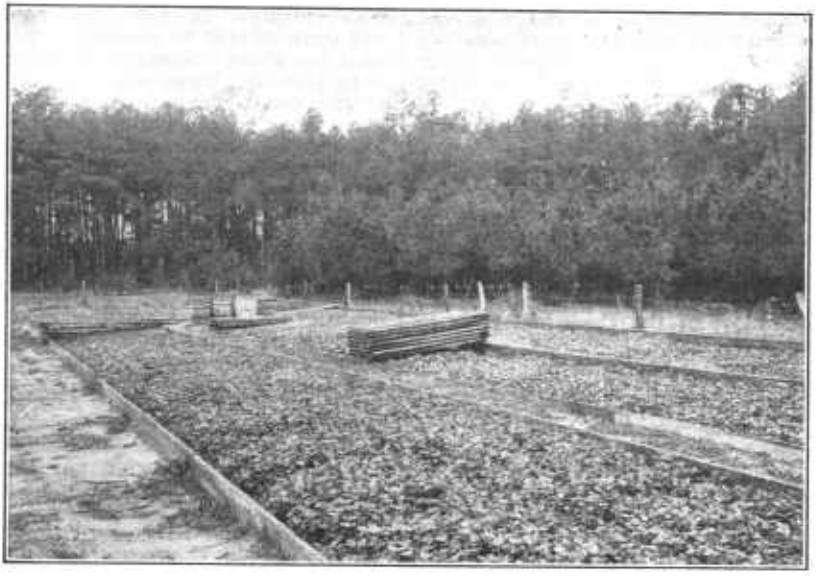

FIG. 3.—A manure-heated hotbed, showing the sash removed and piled where they can be readily replaced in case of danger from frost

After the coldframe is made, sand or loose soil is placed in the bed and the potatoes are bedded in the same way as in open beds.

MANURE-HEATED BEDS

In sections where the growing season is too short to allow the plants to be started in coldframes, it is necessary to grow them in hotbeds, bedding the potatoes about six weeks before weather conditions permit setting the plants in the fields. In order to obtain a quick growth of large stocky plants, bottom heat is necessary. The simplest method of supplying this heat is usually by the use of fresh rapidly fermenting horse manure, but unfortunately the increasing scarcity and high cost of this material often make

its use impracticable. The hotbed should be well protected from north and west winds, as shown in Figure 3. The directions for the construction of a manure-heated hotbed are similar to those given for building coldframes, except that the excavation under the frame is 12 to 18 inches deep. Before putting the manure in the bed it is a good plan to pile it and turn it two or three times in order to make it uniform throughout. The manure should be placed in the excavation to a depth of 8 to 12 inches and should be well trampled. If the manure is dry it should be watered in making the hotbed, as moisture is essential to the decomposition by which heat is produced. As soon as heating starts, sand is spread evenly over the manure to the depth of 3 or 4 inches. When the soil temperature drops to 80° or 85° F., the potatoes are placed on the surface and covered with sand, as already explained.

A more permanent hotbed may be made by using concrete for the walls. Where the concrete bed is to be heated by steam or hot water the pipes are usually placed beneath a board floor. With this type of bed the floor has to be repaired or renewed every two or three years.

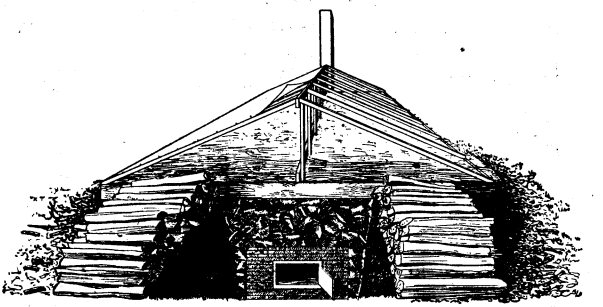

FIG. 4.—A flue-heated hotbed which is used extensively by sweet-potato growers

FLUE-HEATED BEDS

Where large quantities of sweet-potato plants are required and it is difficult to obtain sufficient manure for hotbeds, the heat can be supplied by means of a stove or furnace connected with flues running under the bed. The flue-heated bed (fig. 4) is made 6 or 12 feet wide and may be 100 feet long, but not longer. The side walls for a permanent bed are made of brick, stone, or concrete, but a temporary structure of wood will answer the purpose. The furnace or stove should be so placed that it may be fired from the outside or just inside of a door opening into the space beneath the bed. The stove or furnace is usually connected with 6-inch chimney tiles, which may run the entire length of the bed or discharge the heat into the open space beneath the floor of the bed 25 to 30 feet from the entrance. At the opposite end from the furnace a wooden chimney collects the gases and smoke and carries them to the open air. As the boards forming the floor of the bed absorb moisture from the soil, there is very little danger from fire, but when wood is used for fuel it may be well to place a wire screen over the ends of the tiles to prevent the passage of sparks.

The floor of the bed usually is made of boards supported on timbers placed across the bed with the ends set into the walls. From 4 to 6 inches of sand or loose soil is placed on the floor, and the potatoes are bedded on this.

In order to obtain a uniform temperature under all parts of the bed, it may be desirable to cover the horizontal chimney tiles with soil and to construct the bed so that there will be a gradual rise toward the chimney end.

PIPE-HEATED BEDS

Where a steam or hot-water boiler is used for heating a greenhouse, residence, or other structure, it can often be employed to very good advantage in heating the sweet-potato bed. In fact, where sweet-potato plants are grown on a very large scale it may be advisable to install hot water or steam heat even if it is not used for other purposes. The temperature of the bed can be regulated more easily where steam or hot water is employed than where other methods of supplying heat are used.

When steam or hot-water pipes are used to heat the hotbed, the best results are obtained when the pipes are placed near the bottom of the hotbed pit, the soil being put on a tile or board floor resting on pipe or wood supports so as to leave a space of a few inches between the bottom of the pit and the floor. The number and

size of the heating pipes required depend on the rapidity of the circulation and on the temperature of the water or the pressure of the steam. When hot water is used, four 1½-inch pipes will be ample in most cases for beds not over 50 feet long. For longer beds 2-inch pipes should be used. Two of the pipes serve as flow pipes and two as returns. The water enters at one end, makes the circuit of the bed, and leaves at the same end. The point where the pipes enter the bed should be the highest in the system, and the point where the pipes leave the bed the lowest in the system. The pipes should have a uniform grade and should be evenly spaced, with the flow pipes about a foot from each outside wall and the returns in the middle. When steam is employed the arrangement of the bed and pipes is the same, but smaller pipes may be used. With steam at 10 pounds pressure 1-inch pipes are large enough for 50-foot beds, and 1¼-inch pipes are ample for beds up to 100 feet long.

BEDDING SEED

The time of bedding sweet potatoes varies in different parts of the country. In the northern sweet-potato sections the potatoes are bedded about a month before danger of frost is over, as it is necessary to have plants to set early in the spring in order to mature a crop before frost. The main crop of sweet potatoes in the South is usually bedded long after danger of frost is past, and no bottom heat or protection is given.

Clean sand is the best material in which to bed sweet potatoes, but in the absence of this, fine sandy loam can be substituted. A 3-inch or 4-inch layer of sand or soil is placed in the bottom of the bed. In order not to chill the potatoes a warm clear day should be selected for bedding them. The potatoes are placed by hand, bedding them firmly in the sand, leaving at least an inch space between them. If the potatoes are too close, the sprouts will be so crowded that long spindling plants will be produced. After placing the potatoes, cover them with sand or soil to the depth of about an inch, and when the sprouts begin to force their way through the surface apply 2 inches more of sand.

TEMPERATURE OF THE PLANT BED

The temperature of the plant bed should be allowed to fall below 85° F. before the seed is bedded and should remain more or less constant at 70° to 75° during the greater part of the period that the plants are growing in the bed or until planting-out time. A thermometer should be kept plunged in the soil of the bed and the temperature noted every day for the first 10 days or two weeks. If the manure hotbed is not in a well-drained location there is danger of soil water getting in with the manure and either destroying the heat altogether or starting a second fermentation, which will cause the temperature to run too high and injure the potatoes. The air temperature beneath the sash or other covering should run between 60° and 80°, and during bright days it must be controlled by ventilation.

WATERING THE PLANT BED

As soon as the potatoes are bedded and covered with soil the bed should be thoroughly watered. Later waterings should be given whenever the soil becomes dry. The quantity of water required depends somewhat upon the method of heating employed. With steam, hot-water, or furnace heat more watering will be necessary than if the ordinary manure hotbed is used. The water applied when the potatoes are bedded will generally be sufficient to last for several days, but after the plants begin to form leaves and the cover is left off during the greater part of the day, watering will be necessary every day. The water should never be poured on in a single stream, but by means of a sprinkling can or through a rose or nozzle on the end of a hose. Where very large plant beds are in use it will be necessary to keep some one most of the time to care for the watering, heating, and ventilation. The success of the crop depends largely upon the proper management of the plant bed in order that the right kind of plants may be produced.

COVERINGS FOR PLANT BEDS

Throughout the Gulf Coast and South Atlantic States it may not be necessary to provide a cover to retain heat or protect the plants from cold, but farther north some form of cover should be provided. In the northern part of the sweet-potato district glazed hotbed sash, each 3 by 6 feet in size, are most commonly used. In warmer sections a covering of light canvas or heavy muslin will be sufficient for the protection of the plant bed. Where sash are used they should slope to the south or east in order to admit the greatest amount of light. A canvas or muslin cover should be sup-

ported either upon laths or wires in such a manner that water will drain off and not form puddles and drip upon the bed. Provision should also be made for rolling up the canvas on bright days to admit sunlight and obtain ventilation.

As the date for transplanting approaches, the plants should be hardened to outdoor conditions by leaving the covering off the greater portion of the time for about 10 days previous to transferring the plants from the plant bed to the field. After a time the covering may be left off entirely, but it should be kept where it can be put on quickly in case of a late spring frost. No matter how well the sweet-potato plants are accustomed to open-air conditions, they will be injured by the slightest frost. The covering for the plant bed will last many years if stored in a dry place during the period in which it is not in use. A roof of boards or paper will serve as a covering for the plant bed, but these materials exclude the light and are not so easily handled as the sash or canvas. Where no regular covering material is available, its place may be taken by a layer of fine straw or grass spread evenly over the surface of the bed.

Some growers follow the practice of spreading about 3 inches of fine, fresh horse manure over the bed as soon as the sweet potatoes are bedded; this serves both as a covering and to retain the moisture. When the sprouts begin to appear, a portion of the manure must be removed in order to prevent the plants from becoming too long and slender.

PULLING THE PLANTS

As a general rule sweet-potato plants are set in the field soon after a rain. To avoid delay in planting, the plants should be taken from the bed as soon as the rain ceases falling and placed in crates or baskets ready for transportation to the field, as shown in Figure 5. They should be covered with a burlap bag, a piece of old carpet, or with hay, straw, or other material, to prevent drying while being carried to the field. The plants are not all ready at once, and only those that have formed good roots are "drawn," the others being left until later. In "drawing" the plants, the seed potato is held down with one hand, while the plants are removed with the thumb and finger of the other hand. It often happens that five or six plants will cling together at the base, and these should be separated to avoid loss of time in the field. Where plants are to be set with a transplanting machine it is essential that they be left in the best possible condition to be handled rapidly by the boys who feed the plants into the machine. The roots should all be kept in one direction, and if the tops are long or ir-

FIG. 5.—Pulling sweet-potato plants from a flue-heated hotbed. The plants are carefully selected, placed in tubs, and carted to the field. Note the umbrella used for shading the plants before they are taken to the field

regular they may be trimmed off with a knife.

While pulling the plants it is a good plan to have at hand a large pail or tub containing water and a quantity of clay and cow manure which has been stirred until it forms a thin slime. As the plants are pulled from the bed they are taken in small bunches and their roots dipped into this mixture. This process, termed "puddling," covers the roots with a coating which not only prevents their becoming dry in handling but insures a direct contact with the soil when they are planted in the field or garden.

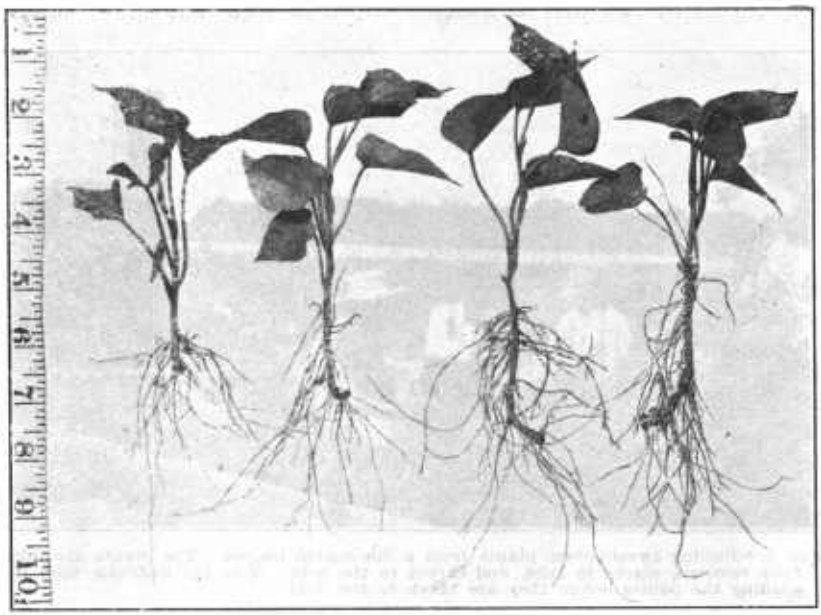

FIG. 6.—Sweet-potato plants in good condition for field planting, with roots and tops well developed

In case the puddled plants become dry in handling they must be puddled again before planting, for a covering of dry, caked clay on the roots is a detriment rather than a help.

Figure 6 shows four plants that are at slightly different stages of growth; those on the right are in prime condition for planting. After removing the plants that are ready, the bed should be watered, to settle the soil where it has become disturbed, and then left for the younger plants to develop.

In preparing sweet-potato plants for shipment or for sale, they are "drawn" from the bed and tied with soft string in bunches of 100 each. Sweet-potato plants will not withstand excessive moisture and should always be packed while the tops are dry. A little damp moss or paper may be placed in the crate or basket and the roots bedded in it, but the tops should remain dry and have ventilation.

PREPARATION OF THE LAND

Sweet potatoes are usually grown on soil which is easy to prepare. The plowing and fitting of the land for this crop are practically the same as for corn. The work necessary for thorough preparation, however, will be well repaid by the ease of handling the crop later. It is always desirable that a crop like sweet potatoes be grown as a part of the regular farm rotation.

The depth of plowing has considerable influence upon the character of the product. The usual depth of plowing in preparing land for corn will prove satisfactory for sweet potatoes. The fact that the potatoes are not planted in the field until late in the spring makes it possible for the grower to select a time when conditions are favorable for the preparation of the land. Plowing may be deferred until the soil has become sufficiently dry to break up fine and mellow. It is important that the land should be harrowed within a few hours after plow-

ing. Further fitting may be deferred until later, and if the soil is inclined to be lumpy the work of pulverizing may best be done shortly after a shower and while the lumps are mellow. When the primary work of preparation is finished, the soil should be mellow to a depth of 6 or 7 inches and the surface smooth and even. The subsequent handling of the soil preparatory to planting will depend upon whether ridge or level culture is to be followed.

After plowing and fitting the land it is generally allowed to lie several days before being put in condition for planting. If level culture is to be practiced, it is only necessary to run the harrow over the soil once, and then mark in both directions the desired distances for planting. The marking is generally done with either a 1-horse plow, a flat-soled marker, or a disk marker. The disk marker is well adapted to this work, as it throws up a slight ridge which furnishes fresh earth in which to plant. Some growers who practice level culture mark the ground with a small 1-horse plow and throw up a slight ridge upon which to plant; behind the plow a roller is used to compress this ridge to a low, flat elevation.

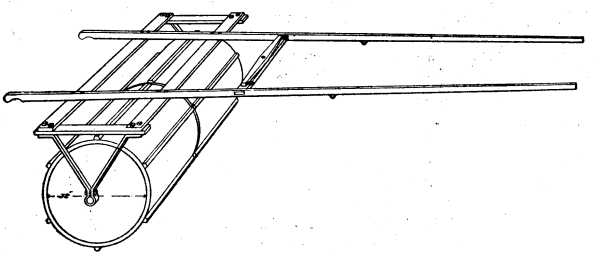

FIG. 7.—A roller used in compressing the ridges. It also marks the distances to plant, by means of the cleats running lengthwise

Where the usual ridge method of planting is employed the soil is thrown up by means of a turnplow or disk machine. The ridges should be made at least one week before planting, in order that the soil may become settled and compact. Most of the sweet-potato growers make the ridges whenever the land is in good condition to work and then either roll or drag the tops just ahead of the planters. By using a roller having cleats nailed at equal distances around its surface, similar to that shown in Figure 7, the ridges at one operation can be rolled and marked the proper distances for planting. A drag suitable for smoothing the tops of the ridges can be easily constructed by cleating together three pieces of a 2 by 4 inch scantling.

SETTING THE PLANTS

The success of the crop depends largely upon the vigor with which the plants start growth after being removed from the bed and set in the field or garden. Many growers plan to set the plants during a "season," or a period when the conditions are suitable for quick growth, either just before a rain or as soon afterwards as the soil can be worked. The method of setting will depend entirely upon local conditions and the acreage to be grown, the essential requirements, however, being to get the roots in contact with moist earth and the soil firmly pressed about the plants.

The use of water around the roots of the plants is desirable under most circumstances, as it not only moistens the soil but assists in settling it about the roots. A large quantity of water is not necessary, half a pint to each plant being generally considered sufficient. If the plants are puddled, as previously suggested, they can be set without danger of loss even when the soil is dry.

The distance plants are set apart in the field depends upon the fertility of the soil, the method of culture used, and the variety of sweet potatoes grown. Where the drainage is good and where a great deal of cultivation is necessary, level culture is practiced. By this method the plants are set in a 28-inch check, allowing for cultivation in two directions. This eliminates hand hoeing and greatly reduces the cost of cultivation. Growing the potatoes on ridges is the most popular method in most sweet-potato sections. Small ridges are thrown up with a turnplow, from 30 to 48 inches apart, according to the fertility of the soil. On good sandy loam soil the plants are sometimes set on ridges 28 to 30 inches apart and 14 to 18 inches apart in the row, but on the poorer sandy soils the ridges are spaced 32 to 48 inches apart and the plants set 14 to 24 inches apart in the row. With plants set 30 inches apart each way, 7,000 per acre will be required. If the ridges are 30 inches apart and the plants 14 to 18 inches in the row,

10,000 to 12,000 plants will be required to set an acre. Good sweet-potato land will readily support 10,000 plants per acre, but the number to set will depend upon the strength of the soil and the fertilizers used.

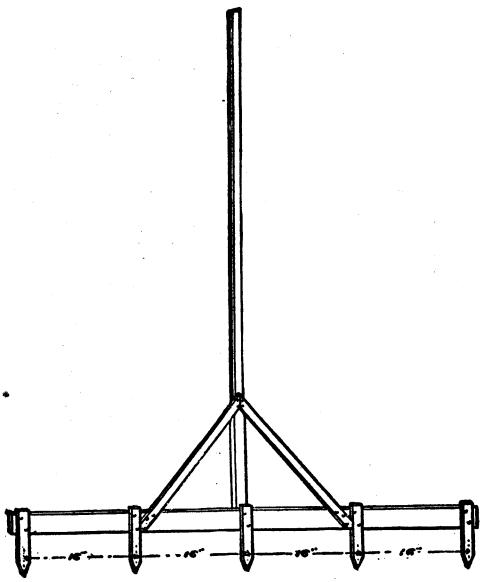

FIG. 8.—A drag marker used in marking off the field when plants are set in checks

Varieties such as the Southern Queen and Porto Rico, which produce a heavy vine growth, are allowed more room than the Yellow Jersey, which makes a small growth of vine.

When level culture is practiced, the field is marked off both ways and the plants set at the intersection of the marks; but when the ridge method is followed it is necessary to provide some means for indicating distances in the row. This may be accomplished in several ways, one being the cleated roller previously mentioned (fig. 7). Another device of this class is made by placing three or four wheels upon a long axle and drawing it with a horse, the wheels being so arranged that they can be set at any point on the axle to provide for changes in the spacing of the plants. Figure 8 shows a drag marker, for marking off ridges where it is desired to set the plants in a check.

METHODS USED IN SETTING THE PLANTS

Where a few hundred plants are to be grown for home use, planting by hand will answer every requirement. A trowel or dibble, as shown in Figure 9, is used for making a hole to receive the plant, and the earth is closed about the roots by a second thrust with the implement, or the heel of the shoe is used to press the earth about the plant. For hand planting, the plants are dropped ahead of the "dibblers" by boys and girls. From 7,000 to 10,000 plants, or an acre, is an excellent day's work for a planter when everything is in good condition. Where plants are set in the garden, it is always desirable to water them before closing the earth about them. Figure 10 shows the method of planting by hand.

PLANTING WITH TONGS.—Setting by hand is at best a back-breaking process, and numerous devices have been invented to save the bending of the body in hand planting. One of the simplest of these is a pair of wooden tongs with which the plant can be caught by the root and thrust into the soil. The plants are either dropped ahead or carried in a small basket strapped to the waist of the operator. The tongs are provided with a spring to throw the jaws apart and are held in one hand while the plants are inserted with the other hand. In case the plants are dropped ahead, the root portion is grasped between the points of the tongs without the use of the hand.

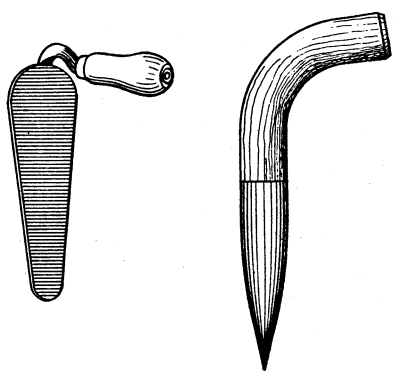

FIG. 9.—A trowel and a dibble, two satisfactory tools for setting plants by hand

An implement known as a shovel, which is sometimes used in conjunction with the tongs, consists of a piece

FIG. 10.—Setting sweet-potato plants

of lath sharpened to a flat point. This is used to open a hole in the soil ready for the plant. In using the tongs and shovel (fig. 12), the plants are dropped as for hand planting. The person doing the setting carries the tongs in the left hand and the shovel in the right. The plants are picked up by means of the tongs, while a hole is made by inserting the shovel in the soil at the point where the plant is to be set. The plant is then inserted and the earth closed about it either by a second thrust of the shovel or by the foot of the operator. A man who is expert in the use of these homemade tools can set plants rapidly without bending the body enough to make the work tiresome.

A tool that is sometimes employed where vine cuttings are planted is a long dibble or a cane having in the lower end a notch covered with cloth or leather. The droppers lay the cutting across the row at the proper distances and the planters place the notch over the middle of the cutting and force it into the soil with both ends protruding. A general idea of these devices may be gained from Figure 12.

SETTING WITH MACHINES

Where a large acreage is grown, the work of setting the plants in the field is greatly facilitated by the use of transplanting machines, of which several makes are on the market. The essential features of these machines are a device to open a small furrow, a tank for the supply of water, and disks or blades for closing the

FIG. 11.—Tongs and shovel, which are the principal planting devices used in the northeastern sweet-potato section. An experienced man can set about 12,000 plants in a day with these homemade implements

soil about the plants. With a transplanting machine it is not necessary to wait for a "season," as the machine automatically pours a small quantity of water around the roots of each plant as it is being set. In operating these machines it is necessary to have a steady team and two active boys, who are trained to place the plants at proper intervals, as indicated by a spacer on the machine. Under reasonably favorable conditions a machine will plant from 3 to 4 acres a day. In addition to being labor savers, these machines do the work better and more uniformly than it is ordinarily done by hand.

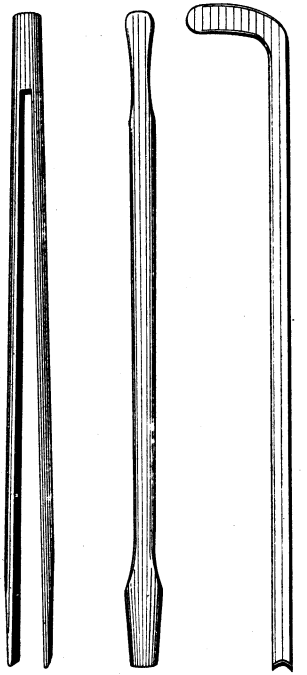

FIG. 12.—Tongs, shovel, and forked dibble used in setting sweet-potato plants

The plants can be set without the use of water, but the results are more satisfactory where it is used. Many growers who are most successful use water even when setting after a rain, claiming that the water has the effect of settling the soil firmly about the roots of the plants and that they start into growth much more quickly. Where the full quantity of water is used it will be necessary to provide a man and team to haul the water to the machine. By this method plants may be set during dry weather without the loss of more than one plant out of every hundred.

Most of the transplanting machines are designed for use either on the tops of ridges or on the level. The cost of setting an acre with one of these machines, using water, should be figured on the basis of two teams with drivers and two boys for a period of three or three and one-half hours. If water is not used there will be a saving of at least one team and driver; also the time required for filling the tank on the machine.

A transplanter in operation is shown in Figure 13.

CULTIVATION OF THE CROP

The methods of cultivating sweet potatoes do not differ materially from those employed with ordinary farm and garden crops. Within a few days after planting, a sweep or a one-horse plow should be run in the alleys to break out the strip of earth left in ridging. The loose earth in the alleys should be worked toward the rows until a broad, flat ridge is formed upon which a small-tooth cultivator can be run close to the plants. After each rain or irrigation the soil should receive a shallow cultivation, and during dry weather cultivation is necessary when the surface becomes settled. About two hand hoeings are generally necessary to keep the rows free from weeds and the soil loose around the plants. As hand labor is expensive, it should be the aim to perform the greater part of the work by means of horse tools. Where sweet potatoes are planted in checkrows and worked in both directions, the hand work required will be reduced to a minimum, but a certain amount of hoeing is always necessary.

When the vines begin to interfere with further cultivation, the crop may be "laid by"; that is, receive a final working, in which the soil is drawn well up to the ridges. To do this it is often necessary to turn the vines first to one side of the row and then to the other by means of a stick or wooden rake. After "laying by," the vines may be allowed to take full possession of the land, as shown in Figure 14, and very little attention is required until time for harvesting the crop.

TOOLS ADAPTED TO SWEET-POTATO CULTIVATION

Aside from planting and harvesting, the work of caring for a crop of sweet potatoes can be done almost entirely with ordinary farm and garden tools.

A two-horse riding cultivator is desirable for the general cultivation, and one having disks instead of hoes will serve for throwing the soil toward the rows. For the work of "laying by," a single-row celery hiller is suitable, or a one-horse sweep stock can be fitted with sloping boards and used for this purpose, as shown in Figure 15. Many growers use a small one-horse turnplow for the final cultivation, going twice in each alley and working the soil toward the plants.

DISEASES

The sweet potato is subject to injury from a number of diseases which may attack the young plants in the hotbed or the growing crop in the field or cause decay in storage. The worst of these are stem rot, black rot, foot rot, soft rot, or ring rot, and, in the Southwest, root rot. Descriptions, illustrations, and control measures are given in Farmers' Bulletin 1059, entitled "Sweet-Potato Diseases."

The heavy losses from disease and decay now suffered in some sections are in large part avoidable by the methods recommended. Prevention may well begin at harvest time with the selection of sound, healthy roots to store and to save for seed. Use care in handling to avoid bruises, put no diseased potatoes into storage, and cure and store in suitable houses at the temperatures recommended in Farmers' Bulletin 1442, "Storage of Sweet Potatoes." It is of fundamental importance to use only healthy plants for setting in the field. Purchased stock should be examined with the utmost care and diseased slips rejected. Those who grow their own plants should follow the directions given in Farmers' Bulletin 1059 for disinfecting the beds and sorting and treating the roots planted.

INSECTS

The sweet potato is not seriously injured by many insects, but recently the sweet-potato root weevil has been very injurious in sections of the South, especially in the Gulf Coast States. This insect threatens to become a serious menace to sweet-potato growing.

Cutworms frequently destroy the young plants by cutting them off soon after they are set in the field.

For full information on insects affecting the sweet potato, write to the Bureau of Entomology, United States Department of Agriculture.

FIG. 13.—Transplanting machine in operation

HARVESTING

Where sweet potatoes are grown for the early market, they may be harvested when the roots reach marketable size, regardless of season or maturity. In this case the potatoes are dug, crated, and sent to the market for immediate consumption. The main crop of sweet potatoes, which are intended for storage or for shipping to distant markets at harvesting time, should be well matured before digging. Where freezing weather may be expected to occur early the potatoes should be dug just before the first killing frost, but where frosts are rather late in the season the yellowing of the vines will indicate that the potatoes are mature and ready for digging.

Sweet-potato vines are injured readily by a light frost, which does not

materially injure the potatoes, but should the vines become frozen there is danger of the frozen sap passing down into the potatoes, which will cause them to decay within a short time after harvesting. If the vines have been killed by frost and it is impossible to dig the potatoes at once, the vines should be cut away from the

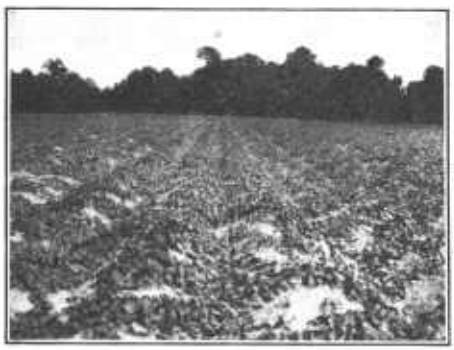

FIG. 14.—A field of sweet potatoes after the vines have practically covered the ground

potatoes and loose soil thrown over the rows for protection from further cold.

The type of implement used in digging sweet potatoes will depend upon the area to be harvested. Where a small area for home use is to be handled, a spading fork, as shown in Figure 16, is satisfactory, but for a large crop a turnplow with colters on the beam or, preferably, special sweet-potato plows of the type shown in Figure 17 should be employed. This plow has sharp rolling colters on the beam to cut the vines ahead of the plow and iron rods projecting from the moldboard which free the potatoes from the soil and vines. Machines used for digging potatoes are not suitable for harvesting sweet potatoes, as they bruise and otherwise injure them. In some sections vine cutters are used to run over the rows in advance of the plow. A disk harrow is sometimes used for this purpose by removing the central disks and running the improvised implement down the rows. This cuts the vines well, but at the same time cuts many of the potatoes near the surface.

After the potatoes are dug they should be scratched out by hand and allowed to dry. A field of sweet potatoes at this stage is shown in Figure 18. It is a bad practice to throw several rows of potatoes together, as they will become bruised and more susceptible to decay. They should not be exposed to the sun very long and should not be left out over night. It is desirable that the soil be comparatively dry at the time of harvesting, and warm, clear weather is best for the proper handling of the crop.

In some of the eastern sections the potatoes are sorted in the field and gathered into hampers, in which they are hauled to the depot platform, where they are packed into barrels and headed. More than half of the crop in this region, however, is packed in the field without the use of packing sheds. The general custom is to grade the potatoes in the field, so as to eliminate the extra handling which is necessary when sorting is done later. Figure 19 shows Yellow Jersey potatoes graded in the field and packed in hampers.

When they are to be stored, a good plan is to gather the sweet potatoes directly from the row into padded baskets and load these baskets on a spring wagon to be hauled to the storage house and dumped carefully into the bins. In grading the potatoes in the field, first go over the row and pick up all the marketable potatoes except those cut and bruised; then pick up all the very large, the very small, and the injured ones. These should be placed in separate bins in storage. Figure 20 shows a wagon well suited for transporting sweet potatoes from the field to the storage house or shipping point.

FIG. 15.—Device for hilling or "laying by"

SELECTION OF SEED

The selection of seed is a matter of vital importance in the successful

growing of sweet potatoes. Careful seed selection aids greatly in controlling diseases, increasing yield, and improving the type. Before starting selection work the grower should have in mind his ideal type of sweet potato and should plant and select only potatoes which conform nearest to this ideal. Selection should be made in the field at harvest time. In this way the grower can see the vine growth, the yield per hill, and the relative size and shape of the potatoes. Select only medium-sized well-shaped potatoes from productive hills free from disease. To insure keeping during storage, these potatoes should be well matured and free from injuries of any kind. The seed potatoes should be kept separate in storage and receive special care. They should not be handled or sorted until bedding time in the spring, as the more the potatoes are disturbed in storage the greater will be the loss by decay. At bedding time the potatoes should be sorted carefully, and special attention should be given to freedom from disease and uniformity of type. Potatoes from vine cuttings are very desirable for seed, as the danger of transmitting disease from the plant bed to the field is lessened.

FIG. 16.—A spading fork which is satisfactory for digging sweet potatoes on a small scale

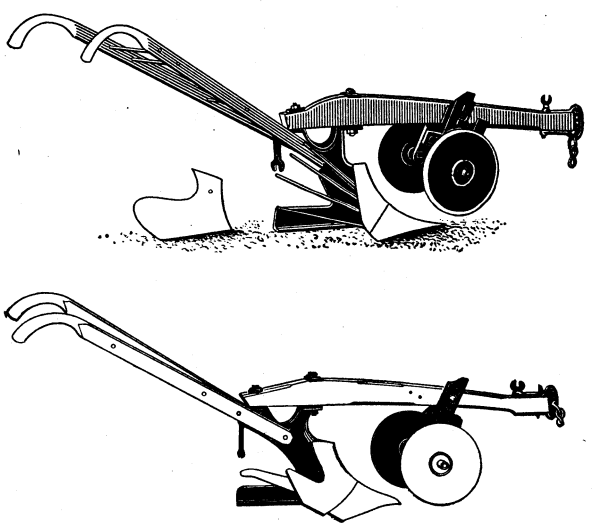

FIG. 17.—Special plows used for digging sweet potatoes. The rolling colters cut the vines, and the rods free the sweet potatoes from the soil and vines

STORAGE

The sweet potato requires a dry atmosphere and a warm, uniform temperature while in storage. Where a large quantity of potatoes is to be stored a specially built storage house should be provided. In case only a few for home use are to be kept they may be placed in crates and stored in the loft over the kitchen or in the basement near the furnace. But even for home use a small storage house or storage room in connection with buildings used for other purposes is most desirable. A sweet-potato storage house should be so constructed that a uniform temperature can be maintained, the influence of the outside temperature reduced to the minimum, and plenty of roof and floor ventilation secured. A great deal of the success of storage will depend on the careful handling of the crop at harvesting time, thorough curing of the potatoes as soon as they are placed in storage, keeping the house free from moisture by judicious regulation of the ventilators, and maintaining a uniform temperature throughout the storage period after the curing process.

For further information on the storage of sweet potatoes and storage-house construction see Farmers' Bulletin 1442, "Storage of Sweet Potatoes."

GRADING AND MARKETING

Even a well-grown crop of sweet potatoes may lose a large part of its market value by the lack of proper care in digging, handling, and prepa-

ration for market. Precaution must be observed, when digging and handling, to prevent a well-grown product from becoming unsightly through the presence of cuts, bruises, and other defects. Appearance is a big factor in the sale of any lot of sweet potatoes.

The Bureau of Agricultural Economics has adopted a set of market grades for sweet potatoes. Every grower should obtain a copy of these grades, as it is not only important that the stock be of attractive appearance, but also that it be separated into spe-

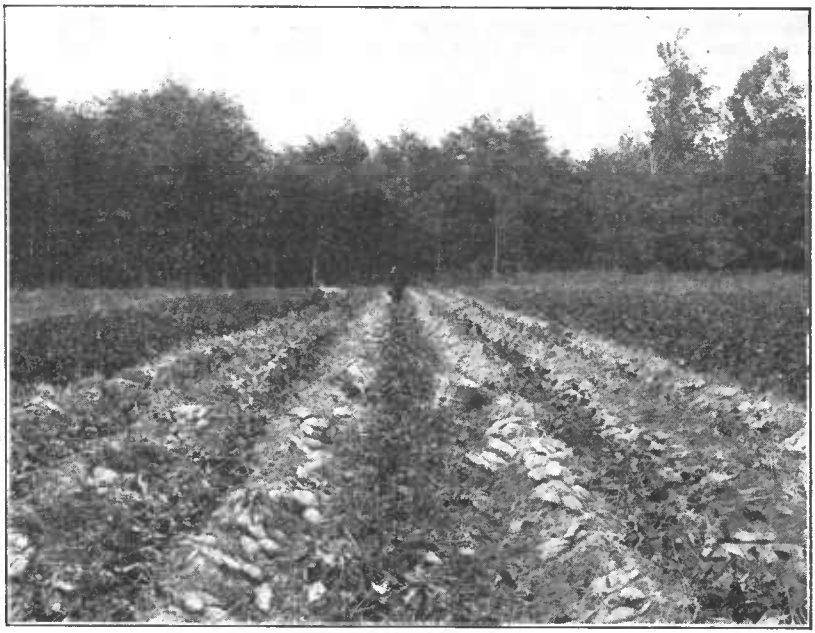

FIG. 18.—A sweet-potato field at harvest time. After plowing, the sweet potatoes are scratched out by hand and allowed to dry before being placed in barrels or baskets

FIG. 19.—Sweet potatoes graded in the field and packed in ⅞-bushel hampers

cially defined grades, if it is to be marketed to the best advantage. Grading is necessary in order to give the consuming public what it demands.

The type and appearance of the container have an important bearing upon the final value of the goods. Never use a dirty second-hand wooden container of flimsy construction just because it is "cheap." Procure a barrel, basket, hamper, or crate that is strongly made and bright and clean in appearance. Never purchase a package that looks clumsy or that is "snide" (short) in measure. When barrels are employed, the law requires that they conform to the United States standard. A hamper, basket, or crate having the capacity of a standard dry bushel is recommended.

A bag should never be used as a container for sweet potatoes, as it furnishes no protection, and the contents are easily bruised, scarred, and skinned. Potatoes that are bruised in handling turn dark in a short time, and decay starts almost immediately. The market value of many lots of sweet potatoes is ruined because of the use of bags.

When packing, use care not to bruise or otherwise injure the stock by rough handling. Bruises and cuts injure the appearance and lower the grade and may cause considerable loss through presenting an opportunity for rot spores or organisms to enter. See that your packages are well filled and that the stock has been carefully shaken down or settled to prevent the container from being "slack" when it reaches the market.

Daily price reports on the sweet-potato market are issued by permanent market stations located in the larger cities of the country. A request addressed to the Bureau of Agricultural Economics, Washington, D. C., will bring these reports to you.

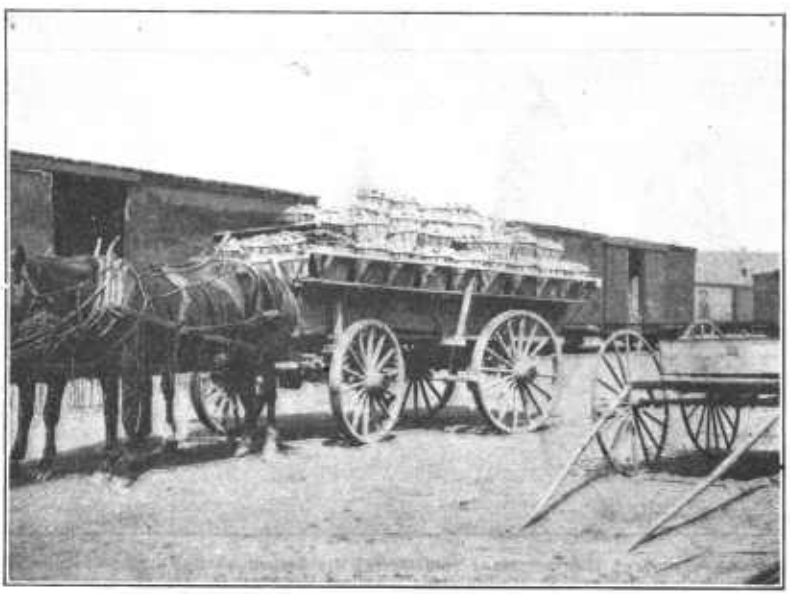

FIG. 20.—Wagon and hampers used in transporting sweet potatoes from the field to the storage house or shipping point

Experienced inspectors have been stationed in many of the larger markets througnout the country. These inspectors are available to shippers of sweet potatoes who desire to obtain reports as to the condition upon arrival of their consignment or of a rejection or dispute between shipper and buyer. A list of these inspectors and the markets in which they are located can be obtained by writing to the Bureau of Agricultural Economics. For quick action in case of a dispute, telegraph to the office of the Bureau of Agricultural Economics, United States Department of Agriculture, located in your nearest market city, or to that bureau at Washington, D. C.

COST OF PRODUCTION

The cost of growing an acre of sweet potatoes will depend upon the method of growing and the regions where grown. Owing to the variation from section to section in cost of labor, rent of land, cost of growing plants, fertility of the soil, rotation followed, storage facilities, and distance to markets, no definite statement of the cost of growing sweet potatoes can be given that will apply to the industry at large.

The crop does not require any considerable amount of hand work and is as a rule no more expensive to produce than the general row crops. Yields as high as 100 barrels an acre are easily obtained, and when the potatoes are well handled they may be disposed of at a profit over the cost of production.

The practice of crop rotation to cut down the fertilizer bill and yet increase the yield, the use of up-to-date storage houses, the ability to choose markets, and the knowledge of how to market—all have a direct bearing on the success of the grower in raising sweet potatoes as a money crop.

COMMERCIAL VARIETIES

Of the many varieties of sweet potatoes grown, only about nine are important from the market standpoint. The choice of a variety should depend upon the market and the purpose for which the potatoes are to be used. The northern markets as a rule prefer a dry, mealy potato of the Jersey type, although some of the moist-fleshed varieties, such as the Nancy Hall and the Porto Rico, find a ready sale when the potatoes have been properly stored and graded and are placed on the market in good condition.

The southern markets demand a moist-fleshed variety. The Nancy Hall and the Porto Rico are the most popular varieties, although the Dooley, the Pumpkin "Yam," and others meet with ready sale. When the potatoes are grown for stock feed, only the highest yielding varieties should be considered. The Yellow Strasburg is a variety that is especially valuable for this purpose.

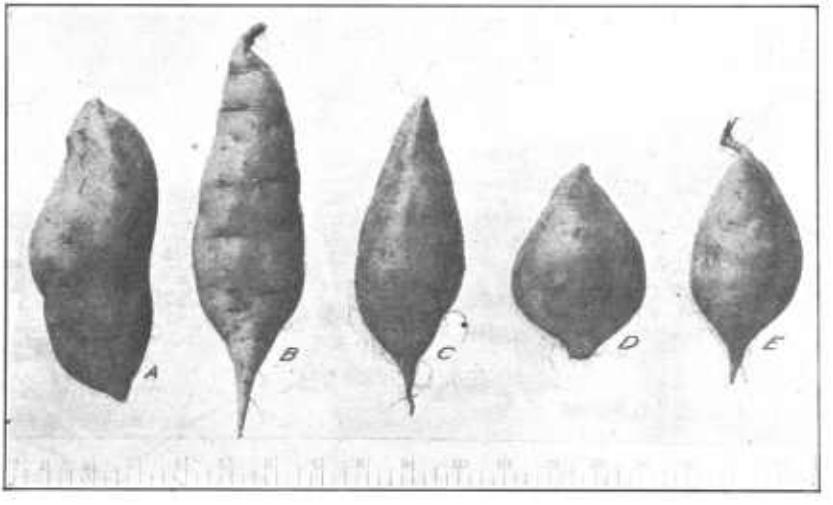

FIG. 21.—Some of the important commercial dry-fleshed varieties of sweet potatoes: *A*, Big-stem Jersey; *B*, Triumph; *C*, Yellow Jersey; *D*, Yellow Jersey; *E*, Red Jersey. Note the two distinct types of the Yellow Jersey variety

Of the dry-fleshed potatoes the Big-Stem Jersey, Yellow Jersey, and Gold Skin are the best known sorts, while the Porto Rico, Nancy Hall, Dooley, Pumpkin "Yam," and Southern Queen are the best known of the moist-fleshed type. The Triumph is a medium moist variety and a potato that is in considerable demand.

BIG-STEM JERSEY

The vines are moderately large growing; long, 6 to 12 feet; stems green, hairy; leaves shouldered or entire, hairy above and smooth beneath, green; petiole hairy, green. Roots russet yellow in color, smooth and regular, long fusiform in shape, may be veined or smooth, small to large

in size, but larger than Yellow Jersey or Red Jersey; season medium to late; flesh yellow.

YELLOW JERSEY

The vines are small, slender, long, 6 to 12 feet; stems green, hairy, often flattened; leaves shouldered or entire, hairy only on the upper surface, green; petioles green, hairy. Roots dark russet yellow, long or short fusiform to globular or ovoid in shape (two types are known on the market, one long fusiform and the other very short), smooth or veined, small to medium in size; season medium; flesh yellow.

veins, slightly hairy on upper surface, smooth below; petioles medium long, 5 to 8 inches, reddish purple in color, deeper at the base of the leaf blade, color extends up on veins of lower side of leaf, color also deeper at base of petiole. Roots light rose to rose in color, fusiform to globular and irregular in shape, smooth; flesh orange-yellow to salmon.

NANCY HALL

Vines medium in length, 4 to 8 feet; stems somewhat hairy, green; leaves toothed or entire with 4 to 10 low marginal teeth. hairy on upper sur-

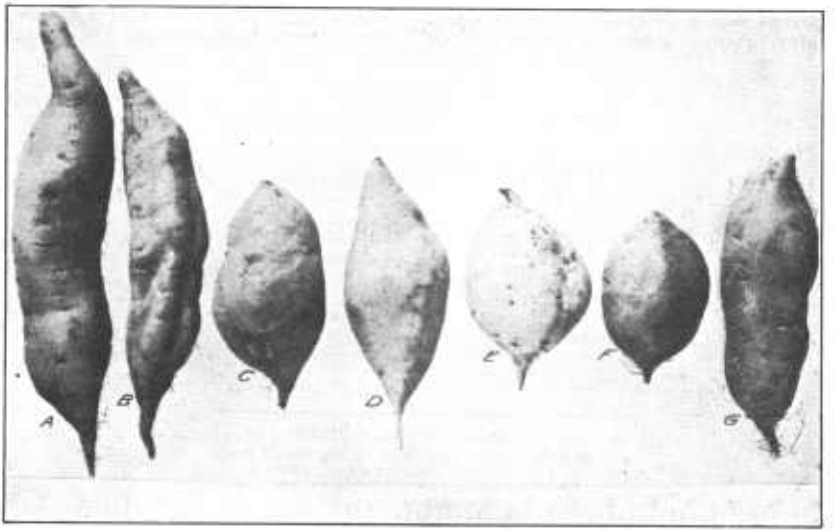

FIG. 22.—Typical specimens of some of the commercial moist-fleshed varieties of sweet potatoes: *A*, Yellow Belmont; *B*, Pumpkin "Yam"; *C*, Porto Rico; *D*, Nancy Hall; *E*, Southern Queen; *F*, Dooley; *G*, Bunch

GOLD SKIN

Vines medium to long, 6 to 10 feet, slender, hairy, especially at nodes, green in color; leaves shouldered or entire (both may be found on same vine), light green, hairy above, slightly hairy beneath; petioles short, slender, hairy, green except slight tinge of purple at base of leaf blade. Roots dark russet yellow, fusiform in shape, smooth and regular; season medium; flesh salmon.

PORTO RICO

Vines medium to long, 5 to 10 feet; stems coarse, internodes short, reddish purple in color, hairy especially at the nodes and on young growth; leaves shouldered, large in size, green except purple at base of blade and on face and slightly hairy or smooth beneath, green except a reddish purple stain at the juncture of the blade and petiole, the latter slightly hairy, green except at upper end. Roots yellow tinged more or less with salmon, veined, or smooth and regular, fusiform in shape, medium to large in size; season early. Of excellent quality.

DOOLEY

Vines long to very long, 10 to 15 feet; stems green, slightly hairy, especially at the nodes; leaves shouldered or often entire; green in color, hairy above and smooth beneath; petioles green, slightly hairy. Roots large in circumference, short fusiform in shape, yellow to salmon in color; flesh dark orange.

PUMPKIN "YAM"

Vines moderately large growing; long, 6 to 12 feet; stems green, hairy; leaves low, shouldered, hairy only on the upper surface, green; petioles green, hairy. Roots yellow tinged with salmon, mostly irregular with prominent light-yellow veins, some smooth and regular with few or no veins, fusiform in shape, medium in size; season late; flesh dark orange yellow.

SOUTHERN QUEEN

Vines large and vigorous; long, 6 to 12 feet; stems dull purple, slightly hairy at nodes and on new growth; leaves shouldered or entire, slightly hairy above, green; petioles nearly smooth, greenish purple. Roots white or light yellow, sometimes very slightly tinged with pink, smooth and regular, few or no veins, fusiform, globular or ovoid in shape, medium to large; season medium; flesh light yellow.

TRIUMPH

Vines coarse and vigorous; short, 2 to 4 feet; bushy; leaves shouldered, large and thick, hairy on veins of upper surface, smooth beneath; petioles green, with purple stain at base of leaf blade, and extending up the veins of the under surface of the leaf. Roots medium to long cylindrical in shape, light yellow to russet yellow in color; flesh light yellow.

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